



## Smart Mirror Using Raspberry Pi

Tanuj Moon , Shwetab Motamwar , Mayur Awari , Rituraj Korde , Ria Jonathan

Prof ; Anand D G Donald

Department of computer science

Rajiv Gandhi College of Engineering Research and Technology Chandrapur,  
Maharashtra, India

### Abstract:

Intelligent mirrors, which continue the works today and will take its place in the future technology , provide both mirror and computer aided information services to its users. Thanks to the microcontroller cards onboard, these systems, which can connect to the internet and take data from the internet, can show this information on the places located on the mirror. In the scope of the study, the developed intelligent mirror system includes the weather information, time and location information, current event information, user information, and camera image taken from web services using Raspberry Pi 3 microcontroller card. Some equipment can be controlled by voice commands via the microphone on the smart mirror .A smart mirror displays applications so that you can check the weather, local news, etc. while you are getting ready in the morning. The mirror will do the thinking for the user in a smart way. This smart mirror aims to reduce and possibly eliminate the need for the user to make time in their daily morning or nightly routine to check their PC, tablet, or smartphone for the information they need. The making of this smart mirror includes a micro-controller called Raspberry Pi which will act as a brain of the interactive system. The micro-controller will be powered using python scripts for mirror software as well as personal assistant. For making of this personal assistant an Amazon Web Services (AWS) account is required. Using the AWS, the Alexa function and a lexa kills using skill kit will be created. Once the function is setup, the function can be accessed using a command line after the software is installed. An 18'' LED Monitor will be placed below an acrylic two-way mirror sheet and the model will be placed in a wooden frame .We'll build a separate personal assistance that will be able to recognize and perform speech to text operations. The personal assistance is named ALEXA. There is a huge scope for this project and AI is much needed today

**Keyword** : Artificial Intelligence ,Raspberry Pi, Arduino.

## INTRODUCTION

We are creating few interface and modules that we are going to use in the smart mirror to make it more user friendly. Efficiency and productivity are two qualities that are increasingly establishing their dominance as keywords companies are using to market their products. The fact that their product can multitask or increase productivity better than the competition has become a real selling point. This is due to the fact that effective time management is an essential factor in increasing production of day-to-day life. The best time management strategies involve being able to find time where there was no time before. Integration of technology into people's daily lives has made that time management possible. The use of products such as tablets, PCs, and smartphones have given people access to the tools needed to be productive. However, though successful technological products have been used to increase productivity, it

has done its fair share to stifle it as well. The use of technology has become another task on everyone's daily to-do list. Technology should mold to our schedule, not the other way around. That is where the smart mirror idea originated. The smart mirror idea aimed to integrate technology seamlessly into people's lives by putting it where everyone's routine eventually collides, the bathroom. The goal of the smart mirror is to increase a user's productivity by saving them time. The smart mirror provides an effortless experience that allows the user to just walk up and be greeted with information

### EASE OF USE A. Magic Mirror

Magic Mirror aims at augmenting the basic reflective mirror with embedded intelligence to combine daily routine tasks like reading newspaper, getting stock updates, weather updates etc. and providing all that data to the user while he/she gets ready. The world around is constantly changing. Interactive computing with wirelessly connected device that are being used in various day to day Activities that are changing and Improving the standard of the Quality Life. Based on this Interactive computing and communication technologies, Many Devices/ Products are now emerging and with this Multimedia Intelligence it is providing comfortable, secure And convenient personal services and making a lot of users comfortable. We have Smart cities, Smart phones, Smart cars and more. This fast way of Life requires the developments of home automation projects. Smart home designs to improve the

comfort, convenience, and security of homes are becoming increasingly important in information communication technology (ICT) to enable new user-friendly services. Smart Mirror is developed to provide convenience for users in managing things and control the usage of electrical appliances in the house with network connection between the lamp and the device. The Smart Mirror would help in developing smart houses. The Artificially Intelligent Smart Mirror is designed to perform several functionalities that can be explained, it will mimic a natural mirror interface through a flat LED monitor used for the mirror display. A one-way mirror is used in front of the LED monitor thereby mimicking the function of a regular mirror. For personalized information services the users will be able to obtain minute updates of latest news and public headlines, weather reports as well as get reports of our interests

## RELATED WORK

We have referred many reference papers, journals and lab works of other colleges and of other countries for our project. Those which were proposed for publishing purposes and also implemented for projects and DIYs. Developed countries have successfully accomplished this project and it's readily available in the market. Whereas, Developing countries have their best attempts to get revolutionized by making their best efforts to compete with the Technology. Indian Technology isn't lagging behind in this field. It's encouraging every individual to be creative in their ideas. 1) In the laboratory of Tianjin University Of China they have proposed a paper on Smart Mirror Using Raspberry Pi where they have concluded well: They used Raspberry pi as host controller and used over internet and obtained many widgets like weather information, time and date using API interface designated by the extra net. They have implemented it with face and voice recognition system and home automation. Its advantage is its portable, user friendly and cost efficient. They have Mimic a natural mirror interface. They used A flat monitor for the mirror display. A one way mirror is used to provide real time display of what is located in front of the Smart Mirror using Raspberry Pi thereby mimicking the function of a regular mirror profiles and store them in the system. According to this profile, customized services are provided to the user. 2) We also went through a Review Paper of International Journal Of Engineering Science Invention (IJESI) proposed by SITRC of Pune :They designed their Smart Mirror which provides a Picture-In-Picture sub display to facilitate the display of services such as Maps and Videos via YouTube. They have displayed their model idea on LED display monitor

which displays all necessary information. They attempted to contribute the model of Smart mirror like interface as well as smart environment to use for interaction. They have tried to promote the use of Ontology to personalise the services. They have used open Standard like Web services to communicate with devices and have customised various personal devices for users need. 3) Another Journal Paper that demonstrates our Project is of International Journal Of Computer Application proposed by BRAC University of Dhaka , Bangladesh :Their Smart Mirror supported IoT and Home Automation which is used to optimise time of doing work and that helps one to increase daily productivity. AI was their main domain to overcome the tasks performed by human resources. They preferred to Personalize Information services: By which Users will be able to obtain minute updates of latest news and public headlines, weather reports as well as get reports of our interests .Mirror applications of theirs are based on face recognition which provides data feed of various websites and services. Their Mirror has the feature of providing news and weather reports as well as providing music and video playbacks. This was done with a MacOS and the music files were fetched from the hard drive of the Mac. Excellent feature of this project was the addition of a medicine box scanner, which allowed the user to buy medicines recognizing their prescriptions. Medical Mirror combines computer vision and signal processing technique for measuring the heart rate from the optical signal reflected of the face Their prototype consists of LCD display with built-in camera and a two-way mirror fitted onto the frame. The smart mirror recognizes the presence of

a user when he or she stands in front of it and, after about 15 seconds, it displays the heart rate below the user's reflected image. The mirror application within a smart home environment, in 2004 Philips Research incorporated the concept of health care developing an

Intelligent Bathroom. This paper presents the design and implementation of a multi-user smart mirror system conceived to promote wellness and healthier lifestyles in the work environment through persuasive strategies.

## DESIGN AND IMPLEMENTATION

Magic Mirror runs some modules like clock, calendar, weather forecasting, news feed, compliments, hello word



## LITERATURE SURVEY

parameters	Paper 1: Fatma ok	Paper2: Murat can	Page 3: Hakan Uc gun	Paper 4: Ugur yugec
Technology	Raspberry Pi3	Raspberry pi2	Raspberry pi	Raspberry pi3
language	python	Java	python	Golang
Display application	Weather ,news ,date ,time, temperature	Weather ,news ,in-built application	Thinks do reminder, temperature	Weather, News ,in-built, application
Person assistant	yes	Yes	no	no

## SYSTEM ARCHITECTURE

## Raspberry Pi 3

### Raspberry Pi



The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in developing countries. It does

multiple tasks. It act as main centre for our proposed model. It is Tiny and affordable The Raspberry Pi is a small, credit card-sized computer that powers the whole thing, displaying the Magic Mirror interface an dunning Alexa, the voice-control system .The Raspberry Pi 3 is a single board computer which features a quad core ARM cortex A-5 processor, with the capability to run Linux based operating systems. The Raspberry Pi 3 has an integrated LAN port which can be used to connect to the internet .It also comes with double row GPIO (General Purpose Input Output) pins which can be used for interfacing it with a variety of I/O devices. We will be installing debian-based Raspbian OS Jesse on the Raspberry Pi and download and install node.js for the packages.

## The two-way mirror



The two-way mirror is made of acrylic and sits flush over the monitor, allowing the graphics on the monitor to come through while maintaining a mirror effect. I ordered my mirror through Among Aluminium. The thicker mirror option (3/16") to prevent a "funhouse mirror" effect

## The Monitor Display



An LED monitor for minimal power consumption, maximum crispness, and to prevent mirror glow at night. The required information for the user will be displayed on the LED monitor.

## The box/frame



shutterstock.com · 138489095

The box/frame houses all the components, including the microphone, and looks pretty.

## Speakers for Output

A 3.5mm jack speaker will be required for speech output of the personal assistant

## Conclusion

This project started as an attempt to contribute in bringing smart homes and devices to Bosnia and Herzegovina. Although the features this device offers are bare minimum of what it could offer, there is room for improvement and further development. At this time, the purpose of the displayed information on the mirror is to save the time spent in the mornings in search for such information. In the future, additional features will be added to the mirror, allowing it to be more customizable and user friendly. Users

will be more in control in terms of selecting which type of information they wish to be presented with. They will also be able to interact with the mirror by using their smart phones. Smart Mirror is currently a hot topic. The purpose of this paper was to provide an overview of currently available solutions and

detailed instructions on how to build your own. With enough time and effort, this project could turn into a great opportunity for further development and integration with other smart home components.

## Reference

- 1.P. Ridden, "Cybertecture' s magical mirror is bursting with augmented information",Newatlas.com, 2017. [Online]. Available: <http://newatlas.com/cybertecture-smart-mirror/20227/>
- 2.A. Chan, "Samsung Wins CES Innovation Award For Smart Window Display - PSFK", PSFK, 2012. [Online]. Available: <https://www.psfk.com/2012/01/samsung-smart-window-ces.html>
3. D. Zax, "Samsung's Smart Window", MIT Technology Review, 2017. [Online]. Available: <https://www.technologyreview.com/s/426662/samsungs-smart-window/>
4. "SERAKU Corporation, Ltd.", Smart Washbasin, 2017. [Online]. Available: <http://smart-washbasin.seraku.co.jp/english/about/index.html>
5. "Memomi Memory Mirror",Memomi Memory Mirror, 2017. [Online]. Available: <http://memorymirror.com/>
6. "My Bathroom Mirror Is Smarter Than Yours", Medium, 2017. [Online]. Available: <https://medium.com/@maxbraun/my-bathroom-mirror-is-smarter-than-yours-94b21c6671ba#.uq4h3aqa0>
7. E. Cohen, "Introduction Smart Mirror Documentation", Docs. smart-mirror.io, 2017. [Online]. Available: <https://docs.smart-mirror.io/>
8. "What is the Internet of Things (IoT)? - Definition from Techopedia", Techo- pedia.com, 2017. [Online]. Available: <https://www.techopedia.com/definition/28247/internet-of-things-iot>
9. Amazon.com. *Raspberry Pi 3 Model B Motherboard: Computers & Accessories*", 2017. [Online]. Available: [https://www.amazon.com/Raspberry-Pi-RASPBERRYPI3-MODB-1GB-Model-Motherboard/dp/B01CD5VC92/ref=sr\\_1\\_3?ie=UTF8&qid=1490491421&sr=8-3&keywords=raspberry+pi+3+ model +b](https://www.amazon.com/Raspberry-Pi-RASPBERRYPI3-MODB-1GB-Model-Motherboard/dp/B01CD5VC92/ref=sr_1_3?ie=UTF8&qid=1490491421&sr=8-3&keywords=raspberry+pi+3+ model +b)
10. Amazon.com. *12" x 24" Acrylic See-Through Mirror, Imm: Home & Kitchen*", 2017. [Online]. Available: <https://www.amazon.com/12-Acrylic-See-Through-Mirror/dp/B01G4MQ3WQ?th=1>
11. "Creo Parametric 3D Modeling Software — PTC", Ptc.com, 2017. [Online]. Available: <http://www.ptc.com/cad/creo/parametric>
12. T. Otwell, "Laravel - The PHP Framework For Web Artisans", Laravel.com, 2017. [Online]. Available: <https://laravel.com/>



13. "Meet Perseus, the next generation mirror", Meet Perseus, the next generation mirror, 2017. [Online]. Available: <https://www.perseusmirrors.com/shop>
14. S. Mirror, "Smart Touch Vanity Mirror", Evervuestore.com, 2017. [Online]. Available: <http://www.evervuestore.com/smart-touch-vanity-mirror>

